

# **Radio challenges for rural Public Safety communications**

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## Overview

- Cost #1 issue – \$\$\$ in and \$\$\$ out (Taxes, CAPEX, and OPEX)
- Density of users – Loving County Texas  
Population (71 people in 2012 - 677 square miles)
- Similar counties Texas, Nebraska, Montana, Alaska, Colorado, New Mexico, Idaho, North Dakota (NC - a couple of counties under 5000)
- Less than 10 people per square mile is VERY common across the country – even in N.E.
- NY - Hamilton County under 5000 population
- Two Vermont counties under 6000

## Overview

- Here in Boston - every small town has their own spectrum - not efficient. Rural spectrum less of a problem (except borders and high elevation sites).
- Coverage - terrain and land use are usually a part of the problem (there's a reason it's rural).
- Site power – cost/access for a 20 mile power line...
- Site Security then a hundred or more miles from nearest town (Loving, TX has no incorporated towns).
- Infrastructure to site (microwave relay or fiber) - power and security to all the relay sites
  - Copper theft – circular target
  - fiber into rock isn't cheap

# Overview

- Satellite use in rural jurisdictions – CO\$T
- How big a satellite antenna do you need in Alaska - do the path loss numbers at REALLY LOW angles.
- Factor in additional noise (for Alaska)...
- Satellite propagation delays - huge issue for voice
- and some applications....
- Bandwidth for data
- DACA – surrogate satellite mitigates these issues
  - Latency
  - Cost (vs. satellite, lift, ground stations)
  - Omni antenna and available bandwidth



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